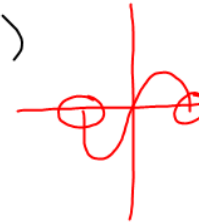


(14) Find pts. inflection $y = x\sqrt{9-x^2}$ $y = x(9-x^2)^{\frac{1}{2}}$

$$y' = x \cdot \frac{1}{2}(9-x^2)^{-\frac{1}{2}} \cdot -2x + (9-x^2)^{\frac{1}{2}} \cdot (1)$$

$$y' = \sqrt{9-x^2} - \frac{x^2}{\sqrt{9-x^2}} \rightarrow x^2(9-x^2)^{-\frac{1}{2}}$$

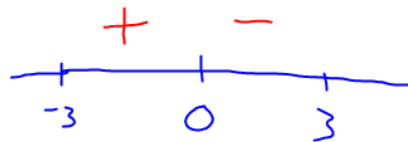


$$y'' = \frac{-x}{\sqrt{9-x^2}} - \left[x^2 \cdot -\frac{1}{2}(9-x^2)^{-\frac{3}{2}} \cdot -2x + (9-x^2)^{-\frac{1}{2}} \cdot 2x \right]$$

$$y'' = -\frac{x}{\sqrt{9-x^2}} - \frac{x^3}{(9-x^2)^{3/2}} - \frac{2x}{(9-x^2)^{\frac{1}{2}}}$$

$$y'' = \frac{-3x}{\sqrt{9-x^2}} - \frac{x^3}{(9-x^2)^{3/2}}$$

y'' zero at $x=0$ $y''=0$
 Undefined at ~~3~~ ~~-3~~
 domain $(-3, 3)$



To find Inflection Pts



- ① Find 2nd deriv.
- ② Find where y'' is 0 or undef.
- ③ Put undefined pts into orig. function
 - to see if they were defined
 - to see if they were end pts.
- ④ checked sign on either side of our potential pts. using the y''

Sect. 4.3

1, 3, 5, 8, ~~10~~, ~~11~~, 17, 18, 20, 22, 23

$$(19) \quad y = \frac{x^3 - 2x^2 + x - 1}{x - 2}$$

$$y' = \frac{(x-2) \overset{\text{dili etc.}}{(3x^2 - 4x + 1)} - (x^3 - 2x^2 + x - 1) \cdot 1}{(x-2)^2}$$

$$y' = \frac{\underline{3x^3} - \underline{4x^2} + \underline{x} - \underline{6x^2} + \underline{8x} - \underline{2} - \underline{x^3} + \underline{2x^2} - \underline{x} + \underline{1}}{(x-2)^2} \quad (\text{expand top})$$

$$y' = \frac{2x^3 - 8x^2 + 8x - 1}{(x-2)^2}$$

$$y'' = \frac{(x-2) \cdot (6x^2 - 16x + 8) - [(2x^3 - 8x^2 + 8x - 1)(2(x-2))]}{(x-2)^4}$$

$$y'' = \frac{\underline{6x^3} - \underline{16x^2} + \underline{8x} - \underline{12x^2} + \underline{32x} - \underline{16} - \underline{4x^3} + \underline{16x^2} - \underline{16x} + \underline{2}}{(x-2)^3} \quad \begin{matrix} \text{expand} \\ \text{top} \\ \text{cancel} \\ \text{on} \\ (x-2) \end{matrix}$$

$$y'' = \frac{2x^3 - 12x^2 + 24x - 14}{(x-2)^3} \Rightarrow y'' = \frac{2(x^3 - 6x^2 + 12x - 7)}{(x-2)^3}$$

try to find factors of top

$$\begin{array}{r|rrrr} 1 & 1 & -6 & 12 & -7 \\ & & -5 & 7 & 0 \end{array}$$

$$y'' = \frac{2(x-1)(x^2 - 5x + 7)}{(x-2)^3} \rightarrow \text{non real roots (ignore)}$$

y'' is zero at $x=1$

y'' is undefined at $x=2$

